CLAIMS

1. An image coding device comprising:

a tile decomposition portion for decomposing image data into tiles each having N pixels x M pixels and outputting the N pixels x M pixels in the tile as an objective data to be coded for a corresponding each of the tile;

a wavelet coding portion for extrapolating a predetermined data at the neighboring of the objective data from the tile decomposition portion, decomposing each of the tiles into subbands and separately wavelet-encoding each of the tiles;

a management information generating portion for generating management information necessary for independently decoding coded data of the subbands from the wavelet coding portion on a tile-by-tile basis as well as on the subband-by-subband basis; and

a coded data integrating portion for combining the data separately wavelet-encoded on a tile-by-tile basis according to the management information outputted from the management information generating portion and attaching the management information to the coded data.

2. An image coding device as defined in claim 1, wherein the tile decomposition portion decomposes original image data into tiles each of the N pixels x M pixels and outputting, as the objective data to be coded corresponding to said each of the tiles, a result of multiplying each of the tiles and neighboring

pixel data by a predetermined two-dimensional window function.

3. An image coding device comprising:

a tile decomposition portion for decomposing image data into tiles each of N pixels x M pixels and outputting the N pixels x M pixels in the tile as an objective data to be coded for a corresponding each of the tiles;

an adjacent pixel adding portion for providing an objective tile to be coded with adjacent pixels necessary for wavelet transformation of the objective tile to be coded when such pixels exist at the neighboring thereof;

a wavelet coding portion for extrapolating a predetermined data when no pixel existing at the neighboring of the objective tile to be coded, decomposing each of the tiles into subbands and outputting only wavelet coefficients of the codable objective tile;

a management information generating portion for generating management information necessary for independently decoding coded data outputted from the wavelet coding portion on a tile-by-tile basis as well as on a subband-by-subband basis; and

a coded data integrating portion for combining the data separately wavelet-encoded on a tile-by-tile basis according to the management information outputted from the management information generating portion and attaching the management information to the coded data.

4. An image coding device as defined in claim 3, wherein the

each adjacent pixel to be attached to the objective tile is multiplied by a weighting function according to a distance from the objective tile, when each of the objective tiles is attached the adjacent pixel according portion.

5. An image coding device comprising:

a wavelet coding portion for decomposing an image into subbands by extrapolating a predetermined data at the neighboring of the image, and performing wavelet encoding of the subbands;

a tile composing portion for reconstructing, from wavelet coefficients inputted from the wavelet coding portion, separate tiles each being composed of N x M wavelet coefficients forming a (membership) set to be separately entropy coded;

a management information generating portion for generating management information necessary for independently decoding coded data outputted from the wavelet coding portion on a tile-by-tile basis as well as on a subband-by-subband basis; and

a coded data integrating portion for composing a sequence of the coded data according to the management information from the management information generating portion and attaching the management information to the coded data.

6. An image coding device as defined in any of claims 1 to 4, wherein the wavelet coding portion is provided with a memory necessary for storing at least data for the tile.

7. An image coding device as defined in any of claims 1 to

6, wherein the wavelet-coding portion performs multiple times the subband decomposition process by selectively applying suitable filters for respective subbands.

8. An image coding device having a combination of plural coding systems selectable from claims 1 to 7 and having a plurality of selectively applicable coding modes, which further includes a flag generating portion for generating flags indicating respective coding modes, a control portion for controlling the coding device in a mode specified by the flag generated by the flag generating portion, and a management information generating portion for generating management information from the flags outputted by the flag generating portion and tile-and-subband information.

9. An image coding device as defined in any of claims 1 to 8, which is further provided with an ID generating portion for generating IDs for identifying respective tiles and a management information preparing portion for preparing management information from IDs generated by the ID generating portion and tile-and-subband information outputted by the wavelet-coding portion.

10. An image coding device as defined in claim 9, which is further provided with an adjacent tile ID deciding portion for generating IDs of adjacent tiles around an objective tile to be coded by using ID information from the ID generating portion and tile information from the wavelet coding portion, and a management information preparing portion for preparing

management information from IDs of an ID of the objective tile, IDs of adjacent tiles and tile-and-subband information from the wavelet coding portion.

11. An image decoding device for receiving coded data coded and inputted by the image coding device of claim 1 and reproducing a desired image by selectively decoding the coded data of necessary tiles and subbands, comprising:

a management information separating portion for separating tile-and-subband management information from input coded data;

a coded data extracting portion for selectively extracting coded data of required decodable objective tiles and subbands according to the management information;

a wavelet decoding portion for performing wavelet decoding of the extracted coded data in compliance with the wavelet coding conducted by the image coding device of claim 1; and

a tile combining portion for combining wavelet-decoded tile images into a desirable image.

12. An image decoding device for receiving coded data coded and transmitted by the image coding device of claim 2 and reproducing a desired image by selectively decoding the coded data of necessary tiles and subbands, comprising:

a management information separating portion for separating tile-and subband management information from the input coded data;

a coded data extracting portion for extracting coded data

part corresponding to an objective tile and subbands according to the management information;

a wavelet decoding portion for performing wavelet decoding of the extracted coded data in compliance with the wavelet coding conducted by the image coding device of claim 2; and

a tile integrating portion for arranging wavelet decoded data at respective places on an original image and superposing image values at overlaps of neighboring tiles to integrate the tiles into a desired decoded image.

13. An image decoding device for receiving coded data coded and inputted by the image coding device defined in any of claims 3 to 5 and reproducing a desired image by decoding the coded data of necessary tiles and subbands, comprising:

a management information separating portion for separating tile-and subband management information from the input coded data;

a coded data extracting portion for extracting coded data part corresponding to an objective tile and subbands according to the management information;

a wavelet decoding portion for performing wavelet decoding of the extracted coded data in compliance with the wavelet coding conducted by the image coding device defined in any of claims 3 to 5; and

a tile integrating portion for arranging wavelet-decoded data at respective places on an original image and superposing image values at overlaps of neighboring tables to integrate

the tiles into a desired decoded image.

14. An image decoding device for receiving coded data coded and inputted by the image coding device defined in any of claims 3 to 5 and reproducing a desired image by selectively decoding the coded data of necessary tiles and subbands, comprising:

a management information separating portion for separating tile-and subband management information from input coded data;

a coded data extracting portion for selectively extracting coded data of required decodable objective tiles and subbands according to the management information;

a wavelet decoding portion for performing wavelet decoding of the extracted coded data in compliance with the wavelet coding conducted by the image coding device defined in any of claims 3 to 5, and

a wavelet-coefficient rearranging portion for rearranging the wavelet coefficients reconstructed on a tile-by-tile basis by the wavelet decoding portion into an initial order of them before having been tiled.

15. An image decoding device as defined in any of claims 11 to 14, wherein the wavelet decoding portion includes a memory for storing data at least for the tile.

16. An image decoding device as defined in any of claims 11 to 15, wherein the wavelet decoding portion repeats multiple times the subband composition with use of filters changeable for respective subbands.

17. An image decoding device for receiving coded data encoded

and inputted by the image coding device defined in claim 8, the device having a combination of plural decoding systems selectable from claims 11 to 16 with plural decoding modes and selectively decoding coded data for necessary tiles and applicable, wherein it is further provided with:

a management information separating portion for separating management information from the input coded data;

a flag extracting portion for extracting from the management information a flag for specifying a decoding mode used for decoding the coded data; and

a control portion for controlling the decoding device to be activated in a decoding mode corresponding to the extracted flag.

18. An image decoding device as defined in any of claims 11 to 17, which receives coded data encoded and inputted by the image coding device defined in claim 9 and reproduces a desirable image by decoding the coded data on the subband-by-subband basis and on the tile-by tile basis, wherein it is further provided with an objective tile deciding portion for deciding an ID of a tile to be decoded and a control portion for controlling input data to the wavelet decoding portion according to management information from the management information separating portion so as to decode only decoded data of the tile having the decided ID.

19. An image decoding device as defined in claim 18, which receives coded data encoded and inputted by the image coding

device of claim 10 and reproduces a desirable image by selectively decoding the coded data on the subband-by subband basis and the tile-by-tile basis, wherein it is further provided with a buffer for storing input coded data and a control portion that recognizes next coded data to be decoded being a tile decided by the objective tile decided portion by referring to the management information separated by the management information separating portion and controls the buffer so that only coded data for the decided tile and adjacent tiles specified by the management information is inputted to the wavelet decoding portion.